INDUSTRIALES RESEARCH MEETING 16

NOISE MITIGATION STRATEGIES IN SMART CITIES

GRUPO DE INVESTIGACIÓN EN INSTRUMENTACIÓN Y ACÚSTICA APLICADA

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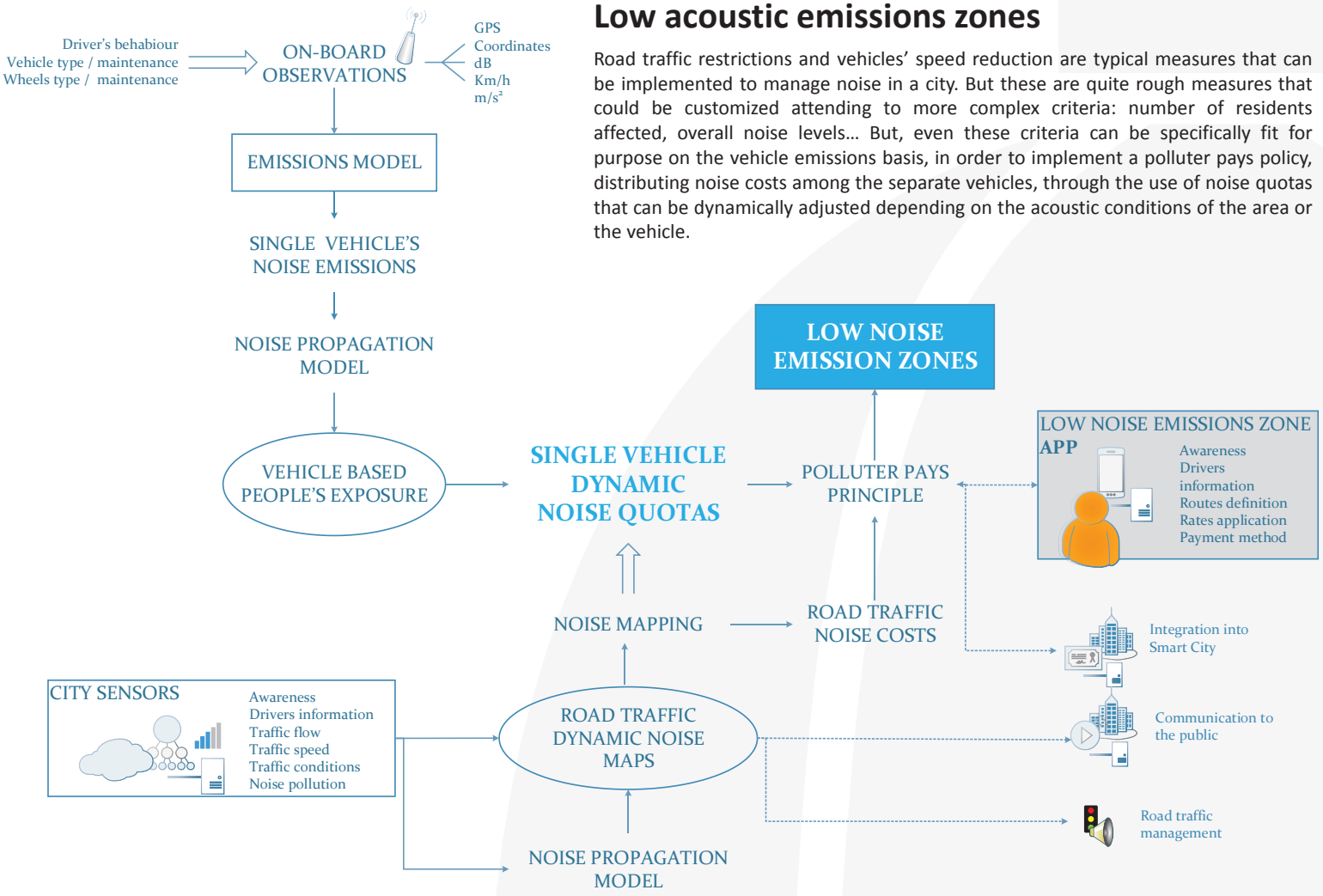
Abstract

The irruption of information and communication technologies (ICTS) and social networks has enabled novel opportunities to manage noise in Smart Cities. For instance, noise assessment using networks of low-cost sensors and dynamic noise maps provides a certain opportunity to apply the polluter pays principle to road traffic management in a city, using noise quotas that can be dynamically adjusted to individual vehicles, depending on factors such as the acoustic pollution conditions in an area, the people living in that area, the state of maintenance of a vehicle, the driver's behavior… Additionally, it is necessary to establish the minimum requirements that noise sensors must comply so that noise assessment can be accurate and precise applying a cost-benefit criteria.

Low acoustic emissions zones

Road traffic restrictions and vehicles' speed reduction are typical measures that can be implemented to manage noise in a city. But these are quite rough measures that could be customized attending to more complex criteria: number of residents affected, overall noise levels… But, even these criteria can be specifically fit for purpose on the vehicle emissions basis, in order to implement a polluter pays policy, distributing noise costs among the separate vehicles, through the use of noise quotas that can be dynamically adjusted depending on the acoustic conditions of the area or the vehicle.



Requirements for a low-cost noise monitoring network

Monitoring acoustic pollution in a city is necessary because of the following reasons:

- To assess noise environment, having objective indicators describing the acoustic situation
- To inform the residents about their noise exposure, using measures that improve trust among the general public
- To rate the situation in comparison to regulations
- To compare different locations and areas, in order to establish priorities for action plans
- To determine the reduction required in each area
- To determine which are the stages of noise at each location, along a working day, during weekends…
- To raise noise awareness at all society levels (bar, pub and restaurant owners and users, residents, and even authorities).
- To give support to any mitigation action, which could have effect for owners, users or residents.
- To evaluate the efficacy of any mitigation measure

There is an international standard describing the requirements of sound level meters, and traditional noise monitoring units must conform to these requirements. But these type certified monitors are quite expensive, and their implementation cannot be as extended as Smart Cities applications would require. This Project aims to identify the requirements that can be relaxed on view of the specific characteristics of urban noise, so that cost-benefit can be optimized in the low-cost Acoustic sensors.